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An Essay

On Tetanus

by

Papet March 14<sup>th</sup> 1825

Randolph S. Stubbs

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Richmond Virginia

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Richard D. D.

## On Tetanus

Man, ever surrounded by dangers, which he cannot foresee, has his existence continually threatened with a thousand means of destruction; his complicated frame is forever subject to accidents and changes, which expose him to a variety of mortal diseases. Is it not then to be wished, that the greatest attention be directed towards the means of preventing & relieving the baneful effects resulting from such causes?

Of all the diseases to which mankind are liable, none require greater attention, or more prompt treatment, than tetanus. When once this most formidable disease invades the human system, it must inevitably, without the aid of timely & efficient remedies, prove speedily fatal. As a distinguished writer observes, "Experience proves, that when tetanus is abandoned to nature, the patient soon dies?" And happily for mankind, this disease, which, by



the continent, was considered as beyond the resources of medicine, has been, by more modern practitioners, combated with much greater success.

Tetanus is most usually defined by medical writers, to be, a violent & spasmodic contraction of the muscles of the body, & particularly those destined to perform voluntary motions.

This disease is observed to occur much more frequently in warm, than in the cold seasons of the year; & more frequently in warm climates than those of a mild temperature. Persons living in low damp situations, are particularly liable to it, when exposed to any of its exciting causes. It may, however, prevail in all countries and situations, & at any season of the year. When occurring in warm climates, & in the warmest seasons of the temperate climates, it is said to be, much more violent, & more frequently fatal. Thus, to the inhabitants of the Torrid Zone, & particularly those of the West Indies, tetanus proves a most

The first of these is the fact that the  
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 increased in the last few years. This  
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alarmingly & destructive complaint.

This disease is mentioned, by authors, to arise from a variety of causes; such as, sudden vicissitudes of heat & cold; exposure to a cold humid atmosphere particularly when the body is at rest; exposure to marsh miasmata. It is also brought on, by lacerated gunshot & punctured wounds; by continual irritation being kept up in the primæ viæ, by means of worms or hard indigestible substances; by great constipation of the bowels; by exhaustion from over exertion; & by the action of powerful stimuli upon the stomach. Cold & moisture contribute much to its development. Barron Larrey, in the campaign of the French army in Egypt, observed that the disease was not often caused by wounds, unless the temperature of the atmosphere passed suddenly from one extreme to the other. The wounded who were exposed to the cold moist air of the nights, were more obnoxious to tetanus; especially, in the spring, when the northwest winds prevailed. On the

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contrary, the disease seldom appeared, when the temperature of the atmosphere was nearly regular; hence he inferred, that this change of temperature was a predisposing cause of tetanus.

This disease has been divided by some authors into two kinds, the idiopathic & symptomatic. It is said to be idiopathic, when it arises from general causes; & symptomatic, when it results from some mechanical injury, done to any part of the body, producing great nervous irritation, such as lacerated or punctured wounds. From whatever causes it may arise, whether from mechanical injuries, or otherwise, the system undergoes the same train of symptoms. But when produced by wounds, it is said to be much more violent & dangerous, than when it occurs idiopathically.

Tetanus sometimes comes on suddenly, & attacks the unfortunate person, with all of its distressing symptoms, in a few hours; but it generally advances much more gradually. At first, the



patient feels some degree of laxitude, followed  
 by an uneasy stiffness of the muscles on the back  
 part of the neck, which increases gradually, &  
 becomes painful & troublesome, when any motion  
 of the head is attempted; As these symptoms  
 advance, he experiences a disagreeable sensation  
 about the root of the tongue; the motion of the  
 jaws becomes painful, & there is considerable  
 difficulty in swallowing. He, at length, feels  
 a sudden & acute pain about the scrobiculus  
 cordis, which extends towards the spine; the  
 spasm & rigidity of the muscles on the neck be-  
 come more severe; & the head is usually thrown  
 backwards. The muscles of the lower jaw, which  
 were, at first, only stiff & painful, are now more  
 violently affected; & owing to the great inequality  
 of strength between the elevators & depressors of  
 the jaw, the teeth are so closely set together,  
 that, with the greatest exertion, an opening can  
 not be obtained, sufficiently wide, to admit a



small spoon into the mouth. As deglutition is painful, & attended with an increase of the spasms, the patient refuses to take any nourishment.

Thus, the disease advances, affecting by degrees, the different parts of the system. From the muscles about the neck & face, the spasms extend to those of the back & abdomen, then to the inferior, & lastly to the superior extremities. In the course of the disease, the abdominal muscles are drawn inwards, so as to impede the action of the diaphragm during ~~inspiration~~, & the abdomen remains flat, tense, & unyielding. Such is the situation of the patient, during the time of the spasms, which, after awhile, somewhat relax, & afford some occasional ease. But this truce is of short duration; for soon the spasms return with increased violence, & an aggravation of all the symptoms. Every muscular fibre subservient to voluntary motion, becomes affected; the spasm & rigidity of the muscles of the face



increase; producing great distortion of countenance, & an expression of the most melancholy distress. The pain in the epigastric region returns more frequently, & with greater severity; the pulse becomes quick & irregular; the eyes languid & suffused; the bowels are constipated, & cannot be easily opened. The unfortunate patient is now reduced to the most deplorable condition; & rather wishes to die, than to live, in such excruciating torture; for he is as it were in a continual rack; the body being rigidly extended, & forming one straight, & inflexible piece; the spasms scarcely suspended for a moment, becoming more severe, & continuing longer, on every succeeding attack. Finally, one continued convulsion terminates the life & sufferings of the truly wretched individual.

This terrible disease, most usually terminates about the fourth or fifth day from its first attack. It is seldom attended with fever, or



delirium; the patient generally preserving the free exercise of his intellectual faculties, throughout the whole course of the disease: nor are the natural functions of the system materially deranged. Sometimes, from the unequal contraction of the muscles, the body is thrown into different, & highly painful postures. These unnatural positions are called, *emprosthotonos* or *opisthotonos*, according as, one set of muscles, under a stronger spasm than their antagonists, becomes more contracted; which gives a particular curvature to the body. This difference of posture, was observed by Sarray, to take place in traumatic tetanus, according as, the different parts of the system were wounded. That illustrious writer observes: "I remarked, both in Germany & Egypt, that when tetanus followed wounds of the nerves of the anterior regions of the body, it was of that kind called *emprosthotonos*; & when the nerves of the posterior



regions were injured, opisthotonus was the consequence. Again, if a limb were wounded, so that the injury of the anterior & posterior nerves were equal, complete tetanus was produced?

On the pathology of this disease, authors have written nothing satisfactory. Though, it has, of late years, been treated with much greater success than formerly; its pathology still continues to be enveloped in the greatest obscurity. But by close observation, & diligent attention to its various phenomena, we may yet hope to receive more satisfactory information of a disease, so obscure in its nature, & so destructive in its consequences. On this subject, Richerand observes, "Nothing is more obscure than the true nature of Tetanus; the relation of its phenomena with its causes; the severity of its symptoms; the inefficacy of the remedies; the contraction of the muscles; all, proceed from causes so obscure, that the researches of a crowd of observers, have not yet succeeded in throwing of the veil which obscures it."



From what we can learn in the history of tetanus, the pathology of the disease, seems to be intimately connected with the nervous system. Doct. Reid, in a paper "On the nature & treatment of Tetanus," republished in the 1st Vol. of the Medical recorder, & taken from an European journal, supposes the disease to be seated, exclusively in the spinal canal. And, indeed, the circumstances which evidently present themselves, throughout the course of the disease, make this exceedingly probable. The arguments adduced by the writer, in favour of this opinion, and which deserve particular attention, are the following: There are some muscular parts which resist the effects of the disease for a considerable time, & fall into the general destruction, only towards the fatal period. These muscles may be divided into two classes; the one comprehends all the muscular parts of the thoracic & abdominal viscera; & the other, all those which belong to the organs of any of the five senses. Thus it is observed that the natural functions are little affected; vomiting



sometimes occurs, but generally does not continue. It is usual enough for the appetite of hunger to remain through the whole course of the disease; & what food happens to be taken down, seems to be regularly digested; the urine is regularly secreted, although sometimes restrained, & is voided with difficulty and pain. When the spasms are violent, the pulse is contracted, hurried, & irregular; but the respiration is affected in like manner, & during the remission the pulse & respiration usually return to their natural state. With respect to the second class, we observe that the tongue retains its mobility for a considerable time; the arms also, do not become affected, till long after the lower extremities; & even when the muscles belonging to them are affected with spasms, those above escape, which move the fingers, & those of the arm retain their mobility to the last. The head also, in this disease, is seldom affected with delirium, or even confusion of thought, till the last stage of it, when, by the repeated shocks of a violent distemper, every function of the system is greatly



disordered. By reflecting on these phenomena of the disease, we are led to observe, that the thoracic & abdominal viscera are not primarily affected; & that the disease cannot take its rise from the nervous substance supplying these organs; for even if it so, these viscera must immediately take on disordered action. Hence it must be concluded, that the ganglionic system is not the seat of the disease. The same argument is applicable to the cerebral system, comprehending the intellectual powers, & the five senses. There are circumstances which even show, that these systems have rather a tendency to oppose this disease, than to participate in its effects: thus we observe, that the tongue, which is the principal organ of taste, retains its powers of free motion, until the cerebral system becomes affected. Now, we know that the gustatory nerve is a branch of the fifth pair, which properly belongs to the cerebral system, while the ninth pair are acknowledged to be those which supply the muscular parts of that organ, & are found to arise from the



inferior part of the corpora pyramidalia, to go out of the skull by their proper holes in the occipital bone. We also observe, that the principal organs of touch are the hands, which are placed in the upper extremities. The nerves of touch should then, in this situation, oppose the effects of the disease, which, we find to be the case, as I observed before, that the upper extremities remained a long time exempt from spasm, & that the fingers often continue so to the end. Doct<sup>r</sup> Reid, having thus explained how these two systems do not appear to be the seat of the disease, readily infers that it remains altogether in the other system or that of the spinal canal. He again remarks, that, "the only parts of the body which are engaged in the disease from the commencement, are those constituted of muscles; but upon dissection, there is not the slightest injury to be discovered in the structure. Now we know that the nerves which are distributed to those parts, & are the proper stimulents to muscular action in the living body, all take their origin from the nervous system of the spine.



It is natural therefore to conclude, that, as we cannot discover in examination after death, any morbid change in the parts, which are acted on by the disease, we should expect to meet with some change in the parts, which afford the stimulus to muscular action: hence the disease must be seated in the nervous system of the spine?

From the morbid appearances in dissections of the spinal canal, Dr Reid was further induced to believe, that the disease was of an inflammatory nature, & that its principal seat was in the membranes, which invested the spinal marrow. On the examination of the bodies of persons dying of tetanus, the viscera of the abdomen & those have most usually exhibited a natural appearance; nor could there be found, any morbid appearance, either in any part of the muscular structure of the body.

The brain appears healthy in every respect, except, occasionally, some little increase of vascularity, in its meninges. "It is a singular fact" says Surry, "that the brain is not disordered, when the nerves, & particularly those of animal life, are extensively injured."



In the treatment of tetanus, a variety of remedies have, at different times, been recommended; such as, opium, purgatives, mercury, turpentine, warm & cold bathing, & the various antispasmodics. Each of these in their turn have had their votaries; & each have been used, seemingly with success. Having never witnessed the treatment of this disease, myself, I can say nothing coming within my own knowledge. But if I may be permitted to judge, from the attentive perusal of the records of numerous cases; opium & purgatives appear to be the remedies, mostly to be relied upon; & which have been used with the most decided & satisfactory results. In cases where other remedies have been employed, & to which the cure has been attributed, these medicines have never been wholly omitted; & while the greatest praise is lavished on others, the beneficial effects of these, are passed by unnoticed. Indeed, when a variety of remedies are employed at the same time, it becomes very difficult to determine accurately, the extent of influence



which each has exerted, over the animal economy. Doctr. Parrisi, in his ~~earl~~ <sup>ent</sup> Pharmacologia remarks, "It is evident that the fallacies, to which our observations & experiences are liable, with respect to the efficacy of certain bodies, as remedies, must be necessarily multiplied, when such bodies are exhibited, in a state of complicated combination; since it must be always difficult, & often impossible to ascertain, to which, the effects produced, ought to be attributed."

Opium & cathartics being so opposite in their action on the bowels, the one tending to constrict, & the other to keep them loose, this course of treatment might at first seem somewhat paradoxical. But while the former restrains the rapid progress of the disease, by preventing exhaustion from the violence of the spasms, sufficient time is afforded, for the more permanent, & beneficial action of the latter.

In the employment of opium, that great comforter of human misery, it has been observed that the susceptibility of the system to its action, in this disease,



is much diminished, & that a dose, which might prove fatal, in any other state of the system, would scarcely diminish the spasms in tetanus, or show any sensible effects on the animal economy. It is, therefore, required, that very large doses should be administered, to produce the desired effect. We are never, however, that after the stimulating action of opium has passed off, it is followed by a remarkable sedative effect, which, in persons not accustomed to its use, produces a great degree of debility; hence, it becomes of the utmost importance, to use it with caution, & to attend particularly to its influence on the system. Whenever the spasms are completely subdued, the quantity should be gradually diminished; as a sudden cessation of its employment, might produce a return of the disease. In the incipient stage of tetanus, when the symptoms have been alleviated by the use of opium, Richardson advises a continuance of the opium, to prevent its recurrence. He observes, that he once saw the omission of opium, by



the aid of which, tetanic spasms of the jaw had been happily combated, followed by all the symptoms of tetanus, which advanced with such rapidity, as to cause the death of the patient in twenty four hours. It is recommended by some authors, in giving opium, to combine with it, some other of the most powerful antispasmodics. Of these Sulph. Ether, from its prompt action on the nervous system, seems best adapted for this purpose. By administering the opium in form of tincture, conjoined with Ether, or the Anodyne liquor of Hoffmann, I am much inclined to believe, that its operation would be greatly assisted, & rendered much more efficacious, than when employed alone. The constipation attending the disease, & the fear of increasing it, might be considered by some, as an obstacle to the employment of opium. But, by the early & continued use of cathartic medicines, any apprehension from the constipating effects of the opium, would be entirely obviated. Of the beneficial effects of cathartic media



cases in tetanus, Doct<sup>r</sup> Hamilton has given most decided proofs, in the cases recorded by him. That distinguished author of the work "On purgatives" thus observes, "These medicines have not been altogether excluded from medical practice, in this disease; but they have been exhibited, with a secondary view only; while little, or no attention has been paid to their effect on the bowels; for, in some instances, they appear to have been useful, without this effect having been so much as suspected or acknowledged." Other authorities, & particularly the writers on this disease in the West Indies, have given ample testimony, in favour of the purgative plan of treatment. To the greater attention paid to the state of the bowels than formerly, is greatly attributed, the late infrequency of tetanus in those islands. Doct<sup>r</sup> Caldwell thinks, that if purgatives are useful in this disease, it must be in cases resulting from internal irritation: such cases, as originate in the alimentary canal. He was at a loss to

\* Caldwell's Bulletin



discovery, on what grounds their utility rested, in cases of the disease, arising from external injuries. When the attack does not occur for some time after the accident, Dr Hamilton remarks, that derangement of the stomach, also occurring subsequent to the accident, may be the cause of the disease. And, Mr Abernethy in his valuable work, *on the Origin & treatment of local diseases*, has satisfactorily explained, that local irritation may disorder the digestive organs. This disorder, he observes, by continuing & increasing the affection of the sensorium, may possibly lead to the production of tetanus, at a time, when the wound is no longer irritable. In four cases of tetanus, in which he enquired into the state of the bowels, the evacuations from them were not like feces. Mr Abernethy wished very much, to call the attention of practitioners, to the state of the bowels in this disease. "All the experience," says he "which I have had, relative to the treatment of tetanus, has convinced me, that more benefit



is obtained, by correcting the errors of the digestive organs, than by any other means? The records a case, showing the wonderful effects produced by this course of treatment. A man, who had been wounded in the foot, was carried, about ten days after the accident, to the Hospital. The spasms were so violent & general, that it was scarcely expected he could be taken to his bed alive. The jaws were firmly clench'd, & the muscles of the back & abdomen rigid. Convulsive actions came on frequently, & then all his limbs were violently affected. His bowels had not been relieved for many days. A powder, containing one grain of Calomel & ten of jalap, was given every four hours. It seemed also necessary, to give opium, to mitigate the spasms; but it was mixed with an equal quantity of Calomel. In twenty four hours, his bowels were freely purged. The evacuations were very unlike feces, & so extremely offensive, that the patients were unable to remain in the wards. From this time, however, there was a complete subsidence



of the opium, so that no more opium was required; & the patient recovered, in proportion as the digestive organs regained their healthy functions.

It is true, all the cases recorded by Harrison were of the idiopathic kind; but we are not entirely destitute of proofs, in favour of purgatives, in the symptomatic disease. A case of this kind occurred to my preceptor, Doct<sup>r</sup> Thomas Nelson of Richmond Va.; which was successfully treated, after the purgative plan. The patient, a negro girl, about five years of age, received a wound on the heel, by a horse treading on it. About three weeks after the accident, symptoms of tetanus appeared. The muscles of the jaw & back of the neck became tense; spasms of the extremities occurred, which caused them to be rigidly extended; & the mouth could only be opened about half an inch, during the interval of the spasms. She complained of much pain, in the abdomen & back part of the neck; the tongue was very much forced; the pulse rather feeble, but not frequent, or irregular.



The wound had never suppurated, or shown any disposition to heal. Tincture of opium, & a plaster of Cantharides & oyle of turpentine, were applied to the wound, & active cathartics daily administered, which produced copious discharges, of a very offensive matter. By this means, the disease was completely subdued, & by the use of tonics the patient perfectly restored to health. It may be necessary also to state, that an enema of oyle of turpentine was administered, but this afforded no relief; on the contrary, it produced injurious effects.

Of the great advantages arising from the simultaneous use of opium & purgatives, we have direct evidence, in a case recorded, in the second volume of the Medical-chirurgical transactions, by Mr Parkinson. The patient had received a compound fracture of the leg; & three weeks after the accident was suddenly attacked with pain & stiffness about the back of the neck, & spasm of the muscles of the jaws accompanied with a difficulty of swallowing, & an inability to



open the mouth. Soon after the accession of these symptoms, a drachm of the tincture of opium, was administered, which produced a diminution of the pain in the neck, & the difficulty of swallowing; & some relaxation of the muscles of the jaw. A powder, consisting of six grs of Calomel & twenty of saltp & gum mung, was likewise given, every two hours. Having taken five of these powders, several copious stools, of dark coloured & highly fetid faeces, were discharged, which procured the patient immediate relief. The cathartic powders were repeated regularly, every three or four hours, & a drachm of laudanum continued every two hours. Under this mode of treatment, the symptoms gradually subsided; & the patient's health was completely reestablished. (Mr Parkinson observes, that the amendment greatly depended upon the quantity of alvine discharges; that the patient was always better, the day, on which, the cathartic powders were most effectual. The tinct. opii was found absolutely necessary, to prevent a general uneasiness.



ness, which never failed to come on, when it was occasionally omitted.

A case, somewhat similar to the preceding, is recorded in the same vol. of the *Medico-Chirurgical Transactions*, by Mr Harkness, & which was treated in a very similar manner. Prodigious quantities of the medicines were required in this case, before the disease could be subdued. It was brought on by a wound on the side of the head. About ten days after the wound had healed, a slight rigidity was felt in the jaws, which gradually increased, so that the patient was unable to get more than a small knife into the mouth. He experienced a stiffness or weight in the eyelids, which became much swelled. The nose was also somewhat tumefied & stiff & over the whole body he had a sensation of weariness. At length, a general rigidity & hardness came on, over the whole system, but particularly of the neck, back, & abdomen; the latter being extremely tense & unyielding. For some time, there was a considerable difficulty of swallowing; but deglutition



was never wholly impeded. A very liberal use of the tinct. opium was determined upon, in this case, together with a large quantity of calomel, conjoined with scammony, colocynth, & gamboge: the patient was recommended at the same time to take plentifully of wine & porter.

He averaged daily, one ounce of the tinct. opii, given at intervals, without having any effect on the sensorium, or of producing pain in the head, acceleration of pulse, or any disposition to sleep. Of the cathartic medicines, he averaged forty grs of calomel, fifty one ext. colocynth, & thirty eight of gamboge, in the day. By this plan of treatment, symptoms of amendment soon began to show themselves. The mouth could be opened, with facility; the tension of the neck, back, & abdomen, gone away; & the patients improvement, was steady & permanent.

The tension of the abdomen was the last symptom, which went off; & when it had slightly abated, the use of the cathartic, never failed to increase it.

In recommending purgative medicines in spasmodic diseases, Doct. Hamilton declined, mentioning any par-



ticular kind: He was at a loss to determine precisely, between those that act on the small, & those that act more particularly on the larger intestines. The cathartics which have been most commonly used in the treatment of tetanus, are colocynthis, scammony, jalap, gamboge. As this disease requires also the use of opium, rhubarb from its not being restrained in its action by the opium, seems to possess an advantage over many other medicines of this class. Professor Chapman, in his work on Therapeutics, a work which I shall ever read with the greatest delight, thus observes, "Rhubarb has this peculiarity, that however combined with opium, its operation on the bowels, is not at all restrained: & hence it is invaluable, in cases, where a necessity for purging is connected with so much pain, as to demand the interposition of opiates?"

The use of Mercury has been highly recommended by some authors, in the treatment of this disease; & deserves particularly deserving of attention. When employed in the primary stage, it has been found eminently useful,



in arresting its rapid progress. But unfortunately, in most cases, when the disease is far advanced, there is not sufficient time allowed, for the action of the sweating on the system, before the fatal period. It is said, that the most convenient & effectual mode of employing mercury, is that of friction, which is to be rigorously persevered in, so as to produce an affection of the mouth, as speedily as possible. Broussais observed in Egypt, that Mercurial frictions appeared to aggravate the disease, in the cases, in which they were adopted; but in this country, & in the West Indies they have been employed with considerable efficacy.

Doct. Reid, considering the disease to be principally situated in the spinal canal, recommends blisters to be applied to the spine, & to keep up the action of the bowels, by administering powerful cathartics. A course of treatment, somewhat similar to this, has been recently recommended & pursued, in this country. Two cases are recorded, in the third Vol of the Medical Recorder, in which the caustic alkali, applied



over the cervical vertebrae, produced the happiest effects.

In the sixth vol. of the *Medico-chirurgical Transactions*, a case of trismus is recorded, in which great relief was obtained, by an emesis of the *Cl. Suspendina*. The extraordinary effects produced by the *suspendina*, in this case, induces me to give an extract from Dr Phillips's account of it. "On Monday night, Aug 20, I was requested," says Dr Phillips, "to see Miss G., whom I found in strong & general convulsions; the jaw was firmly locked, the whole of the left side paralytic, & what heightened the sufferings of the patient, & made her case peculiarly distressing, were the frequent and unavailing attempts to vomit, which generally succeeded any abatement of the spasms, accompanied with a strong convulsive effort, to force the irritating matter through the nostrils. On this deplorable state, I requested she might be put into a warm bath, & an emesis with sulph. magnesia & infusion of senna to be given. The following morning, we were informed that she felt much relieved, when in the bath,



the spasms were not so frequent, nor so violent; & there was some mitigation of the sickness. The claps were quickly returned; & the bowels had not been relieved. She had an acute pain in the right side, near the region of the liver; on which part, she could not bear the slightest pressure. Leeches were ordered to be applied to the side; & a draught of magnesia was later to be given every three hours, during the absence of the sickness; until a copious evacuation could be procured. 24th, as the motion from the bowels was very inconsiderable, a powder of calomel & scammony was administered. In the evening, she laboured under a convulsive paroxysm; & I proposed, that blood should be taken from the arm, which was immediately done; a draught with fifty drops of laudanum was ordered to be given at bed time, & a warm plaster to be applied to the stomach. 25th, the spasms were considerably diminished; yet there was a distressing return of the sickness, & not the slightest relaxation of the jaw. As the calomel and



seemingly had procured but a scanty stool, I ordered the same powder to be repeated. 26th, the bowels had been very fully opened in the night; the spasms were less frequent & severe, & there had been no return of sickness, since yesterday evening; which encouraged us to hope, that the disease had been partly subdued. This apparent amendment, however, was but a prelude to a return of all the symptoms, in their most aggravated form. The abdominal muscles were particularly affected; the muscles of the face, also partook of the general conflict; syncope came on, & the pulse was weak, rapid, & intermitting; the sickness returned, & was almost insupportable. I immediately desired that a clyster might be thrown up, with some force, from a syringe, composed of half an ounce of the Ol. Turpentine, rubbed down with the yolk of an egg, in eight ounces of infusion of scum. In about five minutes after the enemata was given, we were, in a hurried manner, called by Miss & Mrs. Mother, to go into the bed room, & to our great joy &



surprise, we found the patient sitting up in the  
 bed, smiling, the jaw was completely relaxed, &  
 she, with great complacency, thanked us, for the  
 great & almost instantaneous relief afforded her.  
 There was a total subsidence of the disease & its at-  
 tending bad symptoms. 27th, she was cheerful, &  
 conversed with the greatest ease. In the morning,  
 she had a copious stool of healthy appearance, in  
 which was a small worm, & this was the first,  
 that had been ever observed by her mother, during  
 her daughters life. I now became curious to learn  
 some particulars of her feelings, during the operation  
 of the elypter. It appears that almost, immediately after  
 it was given, she felt a glow of heat, accompanied  
 with a prickling sensation, first, in the calves of both  
 legs, pursuing the course of the spine up to the neck,  
 & afterwards to the head & face; the room then appear-  
 ed to be full of smoke, & the jaw instantly fell?  
 No example of the effects of a remedy, could be more  
 decisive than this; for surely none could afford



more prompt relief in any case, than did the *Ol. terbinthinae*, in the preceding. But might not the cause of the disease, in this case, be attributed to intestinal irritation kept up by the presence of the worm; on the destruction of which, by the turpentine, instantaneous relief was afforded? The great nausea & frequent attempts at vomiting, attending the disease, assists in a great degree, in lending to this conclusion. Whether the same decided advantages would be obtained from the use of *Ol. terbinthinae*, in the disease arising from other causes, is a consideration worthy of attention.

In order to prevent the occurrence of tetanus, from wounds threatening to produce this disease, it is recommended to bring on an inflammation & suppuration in the wounded part, as speedily as possible. The propriety of this becomes obvious, when it is considered, that in traumatic tetanus, there is generally a want of inflammation, & a deficient or unhealthy discharge from the wound. And when inflammation

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& suppuration quickly succeeds a wound, that might  
 be suspected of inducing tetanus, the disease is  
 very rarely observed to take place. The application  
 of caustic, or oil turpentine to the wounded part,  
 has been found very effectual in producing the ne-  
 cessary suppuration, & preventing tetanus. Escharotics  
 of cantharides, applied to wounds, in which the  
 natural secretion is suspended, & also to denuded  
 nerves, which have been irritated by the contact  
 of cold & moist atmosphere, are likewise said to  
 prevent tetanus. "When these applications," says  
 Linnæus, "are made on the appearance of the first  
 symptoms, the natural sensibility of the diseased  
 nerves, & the secretion of pus will be reestablished."

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